High Risk Non-ST Elevation Myocardial Infarction - A Case Report

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Abstract

Coronary artery disease (CAD) is the leading cause of cardiovascular mortality worldwide. Electrocardiogram (ECG) remains an important tool in the diagnosis of acute myocardial infarction (MI) and further risk stratification. ST segment elevation myocardial infarction (STEMI) is a medical emergency requiring early diagnosis and prompt reperfusion of occluded coronary artery to prevent morbidity and mortality. Recent studies have shown that a subset of patients with acute MI in the absence of ST segment elevation (non-ST elevation myocardial infarction [NSTEMI]) have an acute occlusion of the culprit artery on coronary angiography.

The Aslanger’s pattern is a specific ECG finding in acute inferior myocardial infarction with multivessel disease. It allows identification of inferior wall myocardial infarction that does not show ST elevation in contiguous leads but needs rapid evaluation by coronary angiogram and revascularization.

We presented a case of acute coronary syndrome whose ECG showed Aslanger’s pattern and was confirmed to have significant stenosis of the left main coronary artery and right coronary artery (RCA) by coronary angiogram. STEMI criteria of ST elevation involving two contiguous leads may not be sufficient in diagnosing critical coronary artery occlusions in clinical practice.

Introduction

The electrocardiogram (ECG) is an important non-invasive diagnostic tool used to diagnose acute myocardial infarction and other cardiac conditions. It can be used to determine the location and extent of myocardial involvement during acute coronary occlusion. ST-Segment Elevation Myocardial Infarction (STEMI) is a medical emergency caused by acute thrombosis of coronary artery, causing myocardial ischemia and necrosis leading to further
complications. Early diagnosis and prompt revascularization is of utmost importance.

The fourth universal definition of myocardial infarction has become the criteria for diagnosing myocardial infarction [1]. According to the criteria, new ST segment elevation at J point in two contiguous leads with specific cut points based on the location of ST elevation is necessary for the diagnosis of STEMI. Many recent studies have shown that a subset of patients with acute myocardial infarction in the absence of ST-segment elevation in 12-lead ECG, have an acute occlusion of the coronary artery on invasive coronary angiography [2]. Absence of ST elevation in ECG not meeting the criteria of STEMI in two contiguous leads, despite the presence of acute coronary occlusion can lead to delay in revascularization.

We report a case of Acute coronary syndrome (ACS) which is a high-risk pattern not meeting the traditional criteria for STEMI who underwent coronary angiogram and was diagnosed with occlusion myocardial infarction.

**Case presentation**

A 56-year-old woman, known diabetic presented to the emergency room with c/o sudden onset of severe chest pain of compressive type, associated with profuse sweating of one hour duration.

On examination, the patient was conscious, oriented, anxious, diaphoretic, blood pressure was 150/90 mmHg, pulse rate was 120/min, regular, SpO2 (oxygen saturation) was 99%. The respiratory system examination showed no signs of pulmonary congestion. There was no chest congestion. On auscultation, cardiovascular examination was unremarkable except tachycardia.
Figure 1: Electrocardiogram

ECG [Figure 1] was showed sinus tachycardia, ST segment elevation in lead III, ST depression in leads V3-V6 and ST in lead V1 was higher than lead V2. These ECG changes were suggestive of Aslanger’s pattern. A loading dose of antiplatelets, statin and heparin were given. Troponin T was 23.77ng/ml (reference range up to 5 ng/ml). Random blood sugar was 254 mg/dl. Her haemoglobin level was 11.8g/dl and serum creatinine were 0.8 mg/dl. Diagnosis of high risk NSTEMI was made.

Echocardiogram showed dilated left ventricle with regional wall motion abnormality involving inferior wall and infer septum. The ejection fraction was around 45% and normal RV function. Mild mitral regurgitation was present and pericardial effusion was absent. In view of ongoing chest pain and ECG suggesting high risk pattern of occlusion myocardial infarction, patient was referred for coronary angiogram.

Figure 2: Coronary angiogram showing significant ostial left main stenosis
Figure 3: Coronary angiogram showed significant ostial left main stenosis with proximal LAD stenosis

Coronary angiogram showed subtotal occlusion of RCA (Right coronary artery) [Figure 4] with TIMI (Thrombolysis in myocardial infarction) grade I flow distally. The left main coronary artery [Figure 2, Figure 3] had significant ostial stenosis followed by moderate stenosis of distal left main artery. LAD showed moderate stenosis proximally with mild stenosis of proximal LCX (left circumflex artery).

Figure 4: Coronary angiogram showing subtotal occlusion of RCA

The patient’s chest pain settled after the procedure. In view of significant left main stenosis, subtotal occlusion of RCA with multivessel disease, patient was referred for urgent CABG (coronary artery bypass grafting) [Figure 4].
Discussion

ECG remains a critical tool in diagnosis of acute myocardial infarction and the severity of coronary artery occlusion by distinguishing between STEMI and NSTEMI and deciding further course of management in the emergency wards. Early diagnosis of acute coronary occlusion and immediate reperfusion therapy are important to decrease the morbidity and mortality in patients with STEMI.

Many high-risk ECG patterns have been reported in association with acute coronary syndrome due to occlusion of a coronary artery [3]. These ECG patterns include Wellen’s syndrome, De winter syndrome pattern etc. These subsets of NSTEMI behave like overt STEMI cases.

Aslanger et al. reported a new ECG pattern [4] that is a specific finding in acute inferior myocardial infarction with multivessel coronary stenoses and allows identification of inferior myocardial infarction that does not meet STEMI criteria (No ST elevation in at least two contiguous leads). It was associated with large infarct size and higher mortality.

Aslanger pattern was defined as:
1) Any ST elevation in lead III, but not in other inferior leads
2) ST depression in any of the leads V4 to V6 with a positive or terminally positive T-wave
3) ST in lead V1 is higher than ST in V2.

In a study by Muacevic et al, the mortality rate of patients with NSTEMI and Aslanger pattern was 20.0%. Patients probably had hemodynamic instability owing to large area of myocardial involvement due to multivessel disease [4].

467 patients with high-risk acute coronary syndromes were studied by Meyers et al, and 108 patients of them had Occlusion myocardial infarction on coronary angiography. The ECGs taken in those patients did not show ST-segment elevation in up to 40% of them [5].

The limitation of this ECG pattern was that 0.5% of patients without acute MI, may have this pattern, which may be due to chronic changes from previous ischemic injuries. In the presence of old infarctions, acute inferior myocardial infarction may cause a change in the orientation of the lesion vector and cause a similar pattern [4].

STEMI diagnostic criteria (ST segment elevation in two contiguous leads) alone may not be sufficient for diagnosing all acute coronary occlusion MIs [6]. We present an acute coronary syndrome case whose ECG showed with Aslanger’s pattern and coronary angiogram showed subtotal occlusion of RCA and significant stenosis of the Left main coronary artery with multivessel CAD. Patient underwent urgent CABG surgery.
Conclusion

Patients presenting to the emergency ward, with anginal chest pain and ECG features suggesting Aslanger’s pattern should be urgently evaluated by emergency coronary angiography and revascularization should be considered based on the angiographic findings to avoid adverse outcomes.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his/her consent for his/her images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published, and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of Interest: Nil

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References